



Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE.
Vol. LXII. No. 14.

NOTES ON THE AVIFAUNA OF NEWFOUNDLAND.

By G. K. NOBLE.

CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.
MARCH, 1919.

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE EASTERN TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM OCTOBER, 1904, TO MARCH, 1905, LIEUTENANT COMMANDER L. M. GARRETT, U. S. N., COMMANDING, PUBLISHED OR IN PREPARATION: —

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| <p>A. AGASSIZ. V.⁵ General Report on the Expedition.</p> <p>A. AGASSIZ. I.¹ Three Letters to Geo. M. Bowers, U. S. Fish Com.</p> <p>H. B. BIGELOW. XVI.¹⁶ The Medusae.</p> <p>H. B. BIGELOW. XXIII.²³ The Siphonophores.</p> <p>H. B. BIGELOW. XXVI.²⁶ The Ctenophores.</p> <p>R. P. BIGELOW. The Stomatopods.</p> <p>O. CARLGREN. The Actinaria.</p> <p>R. V. CHAMBERLIN. The Annelids.</p> <p>H. L. CLARK. The Holothurians.</p> <p>H. L. CLARK. The Starfishes.</p> <p>H. L. CLARK. XXX.³⁰ The Ophiurans.</p> <p>S. F. CLARKE. VIII.⁸ The Hydroids.</p> <p>W. R. COE. The Nemertean.</p> <p>L. J. COLE. XIX.¹⁹ The Pycnogonida.</p> <p>W. H. DALL. XIV.¹⁴ The Mollusks.</p> <p>C. R. EASTMAN. VII.⁷ The Sharks' Teeth.</p> <p>S. GARMAN. XII.¹² The Reptiles.</p> <p>H. J. HANSEN. The Cirripeds.</p> <p>H. J. HANSEN. XXVII.²⁷ The Schizopods.</p> <p>S. HENSHAW. The Insects.</p> <p>W. E. HOYLE. The Cephalopods.</p> <p>W. C. KENDALL and L. RADCLIFFE. XXV.²⁵ The Fishes.</p> <p>C. A. KOFOID. III.³ IX.⁹ XX.²⁰ The Protozoa.</p> | <p>C. A. KOFOID and J. R. MICHENER. XXII.²² The Protozoa.</p> <p>C. A. KOFOID and E. J. RIGDEN. XXIV.²⁴ The Protozoa.</p> <p>P. KRUMBACH. The Sagittae.</p> <p>R. VON LENDENFELD. XXI.²¹ The Siliceous Sponges.</p> <p>R. VON LENDENFELD. XXIX.²⁹ Hexactinellida.</p> <p>G. W. MÜLLER. The Ostracods.</p> <p>JOHN MURRAY and G. V. LEE. XVII.¹⁷ The Bottom Specimens.</p> <p>MARY J. RATHBUN. X.¹⁰ The Crustacea Decapoda.</p> <p>HARRIET RICHARDSON. II.² The Isopods.</p> <p>W. E. RITTER. IV.⁴ The Tunicates.</p> <p>B. L. ROBINSON. The Plants.</p> <p>G. O. SARS. The Copepods.</p> <p>F. E. SCHULZE. XI.¹¹ The Xenophyphoras.</p> <p>HARRIET R. SEARLE. XXVIII.²⁸ Isopods.</p> <p>H. R. SIMROTH. Pteropods, Heteropods.</p> <p>E. C. STARKS. XIII.¹³ Atelaxia.</p> <p>TH. STUDER. The Alcyonaria.</p> <p>JH. THIELE. XV.¹⁵ Bathysciadium.</p> <p>T. W. VAUGHAN. VI.⁶ The Corals.</p> <p>R. WOLTERECK. XVIII.¹⁸ The Amphipods.</p> |
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¹ Bull. M. C. Z., Vol. XLVI., No. 4, April, 1905, 22 pp.

² Bull. M. C. Z., Vol. XLVI., No. 6, July, 1905, 4 pp., 1 pl.

³ Bull. M. C. Z., Vol. XLVI., No. 9, September, 1905, 5 pp., 1 pl.

⁴ Bull. M. C. Z., Vol. XLVI., No. 13, January, 1906, 22 pp., 3 pls.

⁵ Mem. M. C. Z., Vol. XXXIII., January, 1906, 90 pp., 96 pls.

⁶ Bull. M. C. Z., Vol. L., No. 3, August, 1906, 14 pp., 10 pls.

⁷ Bull. M. C. Z., Vol. L., No. 4, November, 1906, 26 pp., 4 pls.

⁸ Mem. M. C. Z., Vol. XXXV., No. 1, February, 1907, 20 pp., 15 pls.

⁹ Bull. M. C. Z., Vol. L., No. 6, February, 1907, 48 pp., 18 pls.

¹⁰ Mem. M. C. Z., Vol. XXXV., No. 2, August, 1907, 56 pp., 9 pls.

¹¹ Bull. M. C. Z., Vol. LI., No. 6, November, 1907, 22 pp., 1 pl.

¹² Bull. M. C. Z., Vol. LII., No. 1, June, 1908, 14 pp., 1 pl.

¹³ Bull. M. C. Z., Vol. LII., No. 2, July, 1908, 8 pp., 5 pls.

¹⁴ Bull. M. C. Z., Vol. XLIII., No. 6, October, 1908, 285 pp., 22 pls.

¹⁵ Bull. M. C. Z., Vol. LII., No. 5, October, 1908, 11 pp., 2 pls.

¹⁶ Mem. M. C. Z., Vol. XXXVII., February, 1909, 243 pp., 48 pls.

¹⁷ Mem. M. C. Z., Vol. XXXVIII., No. 1, June, 1909, 172 pp., 5 pls., 3 maps.

¹⁸ Bull. M. C. Z., Vol. LII., No. 9, June, 1909, 26 pp., 8 pls.

¹⁹ Bull. M. C. Z., Vol. LII., No. 11, August, 1909, 10 pp., 3 pls.

²⁰ Bull. M. C. Z., Vol. LII., No. 13, September, 1909, 48 pp., 4 pls.

²¹ Mem. M. C. Z., Vol. XLI., August, September, 1910, 323 pp., 56 pls.

²² Bull. M. C. Z., Vol. LIV., No. 7, August, 1911, 38 pp.

²³ Mem. M. C. Z., Vol. XXXVIII., No. 2, December, 1911, 232 pp., 32 pls.

²⁴ Bull. M. C. Z., Vol. LIV., No. 10, February, 1912, 16 pp., 2 pls.

²⁵ Mem. M. C. Z., Vol. XXXV., No. 3, April, 1912, 98 pp., 8 pls.

²⁶ Bull. M. C. Z., Vol. LIV., No. 12, April, 1912, 38 pp., 2 pls.

²⁷ Mem. M. C. Z., Vol. XXXV., No. 4, July, 1912, 124 pp., 12 pls.

²⁸ Bull. M. C. Z., Vol. LVIII., No. 8, August, 1914, 14 pp.

²⁹ Mem. M. C. Z., Vol. XLII., June, 1915, 397 pp., 109 pls.

³⁰ Bull. M. C. Z., Vol. LXI., October, 1917, 28 pp., 5 pls.

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No. 14.— *Notes on the Avifauna of Newfoundland.*

BY G. K. NOBLE.

IN the summer of 1915, through the kindness of Mr. John E. Thayer, the Museum of Comparative Zoölogy was able to send the writer to Newfoundland to study and collect birds.

Several races of birds had previously been described from this region by a number of different investigators, and it was desired to round out the collections of the Museum with a large series of Newfoundland birds.

The Newfoundland Fish and Game Commission extended many courtesies to aid in the collecting. Although a recent ruling by the Board of Commissioners limited the number of birds taken for scientific purposes to six specimens of a species, still the Board granted the Museum of Comparative Zoölogy the privilege of taking:—

1. Two or three additional specimens of each species, these to be given later to the Museum at St. John's.
2. Twelve specimens of a few especially interesting species in addition to those collected for the local Museum.
3. Fifty specimens of thrushes (including the four species) with a few additional specimens for the Museum at St. John's.

These special privileges have enabled me to determine to a certain extent the range of variation in the more questionable species. After a short study, it became at once evident that Newfoundland was a region in which the differentiation of dark colored races was beginning to take place. In the case of certain species, this differentiation has reached the point where well-defined races can be described, but in the case of most species there is only a tendency toward a darkening. Variation curves drawn for mainland and Newfoundland specimens overlap to a greater or less extent. With the limited series of Newfoundland birds available for study, it does not seem advisable to describe any new races, but it is probable that one or possibly two of the birds mentioned below may yet be shown to be distinct from their mainland relatives.

Newfoundland is a region of especial interest to a student of zoögeography, for, as has been pointed out by a keen student of phytogeography, Prof. M. L. Fernald of Harvard University, Newfoundland

possesses a very complex flora. This flora, according to Fernald (1911), contains representatives of four distinct centers of dispersal:—

1. Boreal types, which gained access to Newfoundland probably somewhere from the north.

2. Western or Canadian types not included in the above, many of these being species which, although not found today in any of the country east of the Canadian Rockies, appear again in Newfoundland.

3. Southwestern types, representing the remnant of a coastal plain flora which flourished on an off-shore barrier beach or chain of islands extending along the edge of the continental shelf.

4. Endemic plants or species unknown on the American continent, but finding their nearest relatives in identical or related species of the Irish or neighboring coasts.

Bangs (1913, p. 509, 510) has shown that the evidence afforded by the mammalian life of Newfoundland bears out the existence of at least two of these centers of dispersal, viz.— a boreal center to the north and coastal plain center to the south. In view of the fact that many of the typical Labrador mammals, viz.— Moose, Marmot, Porcupine, Squirrels, certain Mice, Shrews, etc., are absent from Newfoundland, it would appear that this region has not been recently connected with the mainland. The mammalian life of Newfoundland consists of a flux of two elements:— a southern coastal plain fauna, represented by the Vole, Muskrat, etc., and a northern tundra fauna, represented by the Caribou, Hare, etc.

An analysis of the bird fauna lends some support to the views outlined above, but there is no evidence among any of the vertebrates of the existence of an Atlantic landbridge between Newfoundland and the Irish coast. Most of the evidence afforded by the birds is of a negative nature, and yet the absence in Newfoundland of many typical Labrador birds strangely suggests a barrier between Newfoundland and the mainland. The nature of this barrier is well expressed by Fernald (1918, p. 238):—

“In explaining¹ the migration to Newfoundland of a large element from the Atlantic coastal plain of the United States it has been necessary to reconstruct the Tertiary continental shelf, which is now depressed as a shallow bench off the east Atlantic coast of America; and from the botanical and zoölogical evidence, as well as from recently published geological evidence,² it now seems perfectly settled

¹ Rhodora, 13, 135-162, 1911.

² Barrell, Amer. Journ. Sci. Ser. 4, 40, 1-22, 1915.

that the continental shelf formed in the late Pleistocene and even later a nearly continuous although somewhat interrupted floor from New Jersey and southern New England, by way of Sable Island and the Grand Banks, to southern and eastern Newfoundland. And upon this floor the southern flora and fauna migrated to Newfoundland; but the unfavorable conditions of a sand-floor with meager forest and coastal plain bogs and barrens proved unattractive to the life of our rich Canadian forest, with the result that the forest species both of animals and plants, or the species which demand rich or basic soils, were for the most part unable to cross to Newfoundland."

The following tables of species of birds are intended to show the probable affinities between the Newfoundland and mainland avifaunas. It is to be noted that in order to bear out the hypothesis of a former barrier beach fauna, more weight must be placed on the negative than positive evidence. Newfoundland avifauna is more peculiar in the birds lacking than in those present.

1. Birds indigenous or otherwise, present in Newfoundland, but absent from Labrador.

1. *Having southern affinities.*

1. Mourning Warbler.
2. Black and White Warbler.
3. Yellow-bellied Sapsucker.
4. Acadian Chickadee.
5. Newfoundland Oven-bird.
6. Newfoundland Yellow Warbler.

2. *Having northern affinities.*

1. Allen's Ptarmigan.
2. Welch's Ptarmigan.
3. Newfoundland Hairy Woodpecker.
4. Newfoundland Jay.
5. Newfoundland Pine Grosbeak.

3. *Having western affinities.*

1. Willow Thrush.
2. Newfoundland Crossbill.

2. Birds absent from Newfoundland but occurring in Labrador, excluding wide ranging transients and those species represented in Newfoundland by geographic races.

1. Canadian Ruffed Grouse.
2. Spruce Partridge.

3. Sharp-tailed Grouse.
4. Cooper's Hawk.
5. Red-tailed Hawk.
6. Duck Hawk.
7. Black-billed Cuckoo.
8. Ruby-throated Hummingbird.
9. Phoebe.
10. Alder Flycatcher.
11. Hoary Redpoll.
12. Lapland Longspur.
13. Northern Shrike.
14. Nashville Warbler.
15. Tennessee Warbler.
16. Bay-breasted Warbler.
17. Blackburnian Warbler.
18. Pine Warbler.
19. Canadian Warbler.
20. Black-throated Blue Warbler.

3. Birds rare in Labrador but fairly common in Newfoundland.

1. Black-capped Chickadee.
2. Olive-sided Flycatcher.
3. Black-throated Green Warbler.
4. Great Horned Owl.
5. Redstart.
6. Winter Wren.

A feature of as much interest as the gaps in the list of species is the large number of geographic forms recognized, eight in this paper. But there are at least twice as many species in Newfoundland which show a tendency toward darkness. Here, in Newfoundland, one can observe bird-races in the making! It is impossible to say whether this darkening of the coloration is an acquired character induced by the humidity and bleakness of the country, or whether the environment is one which fosters all variations towards darkness, which variations may themselves have arisen independent of the environment. No matter where the truth lies, these tendencies exist, and in these Newfoundland birds, we have represented the very beginning of future geographic forms.

In the preparation of the following notes, I have received the ever generous aid of Mr. Outram Bangs. Mr. William Brewster has loaned specimens for study. Information in regard to the Labrador

birds was obtained from the published works of Drs. C. W. Townsend, G. M. Allen, Mr. A. C. Bent and others, but chiefly from Townsend's and Allen's paper on the Birds of Labrador, (1907).

Annotated List of Species collected.

1. GAVIA IMMER (Brünnich).

Loon.

One adult female from Nicholsville, July 22nd.

The Loon breeds commonly in Newfoundland. Old birds accompanied by young were observed along the Upper Humber from July 9th to 22nd. In the Hopley Hills on July 27th, one young bird was observed with two adults in a small pond, not over a hundred yards in length. Since the young bird was still in the down, the parents must have bred in this very small pond.

2. PUFFINIS GRAVIS (O'Reilly).

Greater Shearwater.

One adult female taken by a fisherman on the Grand Banks early in June.

This bird is without doubt very common off the coast, but I did not have the opportunity of observing any alive.

3. MERGUS SERRATOR Linné.

Red-breasted Merganser.

Two adult females, Nicholsville, July 16th and 17th; three small chicks, one male, and two females, taken near the same place July 8th and 9th, and one large chick from Nicholsville, July 20th.

Red-breasted Mergansers were seen on the Upper Humber July 8th and 9th, and again nearly every day from July 14th to 21st. The old birds were generally accompanied by one or more chicks. On the approach of my canoe, the young birds would dive while the parents would flap away clumsily over the water.

4. *CLANGULA CLANGULA AMERICANA* Bonaparte.

American Golden Eye.

One adult female and two of her chicks, a male and a female (sex questioned) taken on Deer Lake, July 3rd.

Two females, each accompanied by from five to seven chicks, were seen on Deer Lake on several occasions during the first week in July. A third brood was observed on the Humber July 5th.

5. *GALLINAGO DELICATA* (Ord).

Wilson's Snipe.

Two adult males, and two adult females, all breeding birds taken near Nicholasville, July 5th, 7th, 10th, and 15th respectively.

During the month of July, Wilson's Snipe was found abundantly in all suitable, grassy bogs along the Upper Humber.

At Nicholasville, on gray mornings, so frequent in Newfoundland, but more especially in the early twilight, several birds could be heard winnowing at one time.

On July 7th, a brooding bird was flushed from a nest containing a complement of three eggs, but the guide accidentally stepped on the eggs before they could be secured.

6. *LAGOPUS LAGOPUS ALLENI* Stejneger.

Allen's Ptarmigan.

One adult male and two chicks from the Hopley Hills, July 26th and 27th; one pair of adults from the Lewis Hills, August 17th.

When Allen's and Welch's Ptarmigan occur in the same region, their ranges do not overlap but interdigitate. Both species occur on the Lewis Hills, and yet all of the Welch's Ptarmigan observed were found on the bare syenite ridges at a high altitude, while the Allen's Ptarmigans were observed lower down on the sedge-covered hillsides. No Welch's Ptarmigans were seen in the interior. It seems very probable that Allen's Ptarmigan entirely replaces Welch's Ptarmigan in the interior of Newfoundland.

7. *LAGOPUS RUPESTRIS WELCHII* Brewster.

Welch's Ptarmigan.

Two pairs of adults from the Lewis Hills, August 19th and 24th; three young specimens with nearly adult plumage, from the same locality, August 19th and 21st.

Brewster (1885, p. 195) in his original description of this species states:—

“According to Mr. Welch, these Ptarmigan are numerous in Newfoundland, where they are strictly confined to the bleak sides and summits of rocky hills and mountains in the interior. Unlike the Willow Grouse of that island,*** the Rock Ptarmigan are very local, and for the most part spend their lives on or near the hills where they are reared.”

But according to Mr. Hersey's unpublished observations of 1913, and my own made two years later, the Rock Ptarmigan is found today only among the high ridges of the west coast. It seems to me that Arnold's record (Auk, 1912, 29, p. 76) must be considered an error. Arnold states:—

“In a dry place in a large area of spruce bog, and at one of the highest points reached by the railway, we flushed a bird of this species off her nine fresh eggs on June 6.”

Welch's Ptarmigan has hitherto never been observed in a wooded area during the summer months, nor have any of the various naturalists who in recent years have been along the railway between Deer Lake and Gaff-topsails, met with this bird. On the other hand, although Allen's Ptarmigan is exceedingly abundant on these barrens Arnold does not include it in his list of birds observed. I am therefore inclined to believe that the bird Arnold observed was really this latter species.

All of the Welch's Ptarmigan observed were found on the very highest ranges of the Lewis Hills. These are composed mostly of syenite, very much weathered and fragmented. The Ptarmigan apparently feed upon the berries and grasses which form a part of the turf on these hills. All of the crops examined were stuffed with mountain bearberries *Arctostaphylos alpina* (Linné), and contained no insect food.

Welch's Ptarmigan apparently seeks refuge among the broken syenite blocks. The birds upon being flushed never scaled down into

the valley below, as is the custom of Willow Ptarmigan, but flew rapidly to another mass of weathered boulders and there soon hid themselves.

On August 24th, during a heavy rainstorm, while making my way across one of these fields of grotesquely shaped stones, I came suddenly upon a old male bird. It had just emerged from between two great blocks, and stood looking at me. After a few moments hesitation, it stretched out its neck and gave a long cackle, unlike any call I had ever heard. It was a crescendo of clucks, somewhat pheasant-like in quality — *kuk, kuk, kuk, kuk* — each syllable stronger and of a higher pitch than the last.

8. *ASTUR GENTILIS ATRICAPILLUS* Wilson.

Goshawk.

One adult female taken at Nicholsville during March, and preserved in the flesh until June; a pair of large immature birds from Nicholsville July 29th and August 2nd respectively.

On July 6th, my guide, Norman Nichols, showed me a nest which he claimed had been occupied by Goshawks only a few weeks before. It was a bulky structure in a spruce tree about twenty feet from the ground. It was built of sticks arranged in a nearly level platform about one yard across and fifteen inches deep. I both heard and saw Goshawks in the vicinity on several later occasions. Their cry was a monotonous, but almost startling repetition of a sharp note, sounding not unlike the shrill pronunciation of the words *gray, gray, gray!*

9. *FALCO COLUMBARIUS COLUMBARIUS* Linné.

Pigeon Hawk.

Two adult females and a male from Port au Port, August 11th. I expected to find the Pigeon Hawk a common bird in Newfoundland, but aside from the specimens secured, I met with the species only at Deer Lake June 30th, and Spruce Brook September 13th.

10. *BUBO VIRGINIANUS HETEROCNEMIS* (Oberholser).

Labrador Horned Owl.

Four adults of both sexes from Nicholsville, July 10th, 16th, and 30th, respectively; two immature birds July 10th and August 6th

from the same locality; four unsexed adults taken at Glenwood by E. Gillingham and others in January, 1913.

I have compared this series, perhaps the largest series of Newfoundland Horned Owls ever brought together, with the type (M. C. Z. 4,445) of *B. v. heterocnemis* (Oberholser) from Lance au Loup, Labrador, and have not found any constant difference with which to separate the Newfoundland bird. The differences claimed by Oberholser (1914, p. 46) are not constant in the series. The dorsal and ventral coloration, as well as the size of the type, can be matched exactly in the birds of our series. The type specimen has, however, slightly darker bands on the feet than any of our specimens. Still there is such an extraordinary variation in our eight adult specimens, that I cannot regard this as a constant difference. *B. v. neochorus* Oberholser must be considered synonymous with *B. v. heterocnemis*.

Newfoundland Horned Owls breed regularly in the dense forests along the Upper Humber. The crops examined contained only one article of food, the Varying Hare.

11. SURNIA ULULA CAPAROCH (Müller).

Hawk Owl.

One adult female taken at Nicholville, July 14th.

The Hawk Owl is apparently not common in Newfoundland. None of my guides were familiar with it, although they all knew the Horned Owl.

12. STREPTACERYLE ALCYON ALCYON (Linné).

Belted Kingfisher.

One adult male and one adult female, Nicholville, July 16th and 31st.

As with many of the other Newfoundland birds, the Kingfisher is slightly darker than New England specimens. Not only does the general tone above average darker, but the dark streaking of the wings is of a deeper tone.

Several Kingfisher burrows were observed along the Upper Humber. The bird breeds commonly along many Newfoundland rivers.

13. *DRYOBATES VILLOSUS TERRAENOVAE* Batchelder.

Newfoundland Hairy Woodpecker.

Nine adults and five young of both sexes from Nicholasville, Deer Lake, and the Hopley Hills, June 30th to July 31st.

In the regions traversed, the Hairy Woodpecker was found to be not so common as the Downy Woodpecker. It seems to prefer the big trees which have now been cut away from the river banks. In the stands of big timber between Deer Lake and the Hopley Hills, it was apparently breeding, but no young or eggs were secured.

14. *DRYOBATES PUBESCENS MEDIANUS* (Swainson).

Downy Woodpecker.

Ten adults and four immature of both sexes from Nicholasville, Deer Lake, Hopley Hills, and Port-au-Port.

This series of Newfoundland birds shows a considerable range of variation. The white wing-spots vary greatly in size. The ventral surface may be more or less smoky, but this feature appears to be due to dirt. Breeding birds are the most heavily stained. The differences pointed out by Oberholser (1914, p. 43) for distinguishing a Newfoundland race, *D. p. microleucus*, are not at all apparent. It seems to me that these differences are at best only a tendency, and not worthy of subspecific distinction.

15. *PICOIDES ARCTICUS* (Swainson).

Arctic Three-toed Woodpecker.

Three adult males from the Hopley Hills and Nicholasville, latter part of July; three immature specimens of both sexes from Nicholasville, July 16th and August 5th.

No birds of this species were seen anywhere in the rich limestone areas of the southwest. The bird evidently prefers the more truly boreal parts of Newfoundland.

16. SPHYRAPICUS VARIUS VARIUS (Linné).

Yellow-bellied Sapsucker.

Seven adults of both sexes, Deer Lake and Nicholsville, July 1st to 10th.

Sapsuckers were observed on many different occasions. Two broods of recently hatched young were found on July 5th and 6th respectively. Two breeding birds taken July 5th held a number of large red ants in their bills. Other parent birds observed returning to their young also had their bills stuffed with insects, probably ants.

17. COLAPTES AURATUS LUTEUS Bangs.

Northern Flicker.

A pair of adults and an immature female from Nicholsville, July 16th and 20th.

Several others were observed along the Upper Humber, but none in the other regions visited.

18. NUTTALLORNIS BOREALIS (Swainson).

Olive-sided Flycatcher.

Two adult males and one adult female from Nicholsville, July 29th to August 6th.

Other birds of this species were observed at Port au Port and Spruce Brook during the last week of August and the first week of September. A mated pair was observed at Nicholsville, July 29th, but the nest could not be found.

19. EMPIDONAX FLAVIVENTRIS (W. M. and S. F. Baird).

Yellow-bellied Flycatcher.

Eight adults of both sexes from Deer Lake, Nicholsville, and Romain's Brook, June 30th to August 27th.

This Flycatcher is very common in all wooded regions, especially

in patches of second growth birch or in older thickets, so characteristic of the Upper Humber. Arnold (1912, p. 77) records both the Alder and Least Flycatcher from the Humber River region. I met with neither species. Since Arnold records the Alder Flycatcher so common, and does not mention the Yellow-bellied, it seems very probable that the bird he actually saw was the latter species. The record of the Least Flycatcher was probably also a *lapsus*.

20. *OTOCARIS ALPESTRIS ALPESTRIS* (Linné).

Horned Lark.

Seven adults of both sexes from the Lewis Hills, August 17th to 21st.

On the rocky barrens of the Hobley and Lewis Hills, Horned Larks were often seen. They were more common than the Pipits and not so wary.

21. *CYANOCITTA CRISTATA CRISTATA* (Linné).

Blue Jay.

One adult male and an adult female, Romaine's Brook and Spruce Brook, August 27th and 30th.

This single pair averages slightly grayer, less brownish than New England specimens. But several New England specimens before me are nearly identical with the Newfoundland birds.

The pair of birds taken were the only Blue Jays observed during my stay in Newfoundland. It is noteworthy that they were found in the warm southwestern region.

22. *PERISOREUS CANADENSIS SANFORDI* Oberholser.

Newfoundland Jay.

Thirteen adults of both sexes and three immatures, from Nicholasville and the Hobley Hills, July 6th to August 7th.

As stated by Oberholser (1914, p. 49), this subspecies is intermediate between the Labrador and northern New England races, but very near to the Labrador form. The difference given by Oberholser can

be observed only in a large series; any one character of the Newfoundland bird can be perfectly matched in our series of Labrador birds. Thus we may say that in the case of this Newfoundland Jay, we have a tendency toward differentiation which has just become fixed.

This Jay is ubiquitous in Newfoundland, wherever there are woods. During a day's tramp over large stretches of "Mash," bogs of *Picea mariana* Miller and *Larix laricina* (Du Roi), no birds are to be met with save the Newfoundland Jay accompanied now and then by a little flock of Acadian Chickadees. The Jays, like the Chickadees, evidently seek companionship within their families. Throughout the month of July, I found many flocks of young birds always accompanied by one or two old birds, presumably their parents.

23. CORVUS CORAX PRINCIPALIS Ridgway.

Four adults, all females, from the Lewis Hills, August 19th to 25th.

Solitary birds or small flocks were observed along the shores of Deer Lake on several occasions throughout the month of July. A flock of over thirty individuals was found to frequent a restricted area of the Lewis Hills. This was a rocky headland where the birds were accustomed to perch during the morning and evening hours.

24. CORVUS BRACHYRHYNCHOS BRACHYRHYNCHOS C. L. Brehm.

American Crow.

One young male from Port au Port, August 12th. No other Crows were observed.

25. EUPHAGUS CAROLINUS (Müller).

Rusty Blackbird.

Nine adults of both sexes from Nicholsville and Spruce Brook, July 5th to September 18th.

A large number of breeding birds were found in the marshes just east of Nicholsville. Two deserted nests were discovered. Both were in low spruces back of the wet meadow bordering the marsh. Flocks of Rusty Blackbirds passing through Spruce Brook, September 1st to 14th, were observed on several occasions to frequent the garbage cans of the "Log Cabin Hotel."

26. PINICOLA ENUCLEATOR ECHATOSUS Oberholser.

Newfoundland Pine Grosbeak.

Eleven adults of both sexes and three young males from Deer Lake, Nicholville, Hopley Hills, Romain's Brook, and Spruce Brook, June 26th to September 13th.

Future work will probably show that this race is not really distinct from *P. e. leucura* (Müller). The eight adult males in the series show a great range of variation in the intensity of their red tones. But even the darkest and dullest individuals agree perfectly with New England birds of similar dates. Nor do I find that the females are "darker on upper and lower parts" (Oberholser, 1914, p. 51), than New England birds. There is an apparent difference in the measurements, but this is not great. The eight adult males measure: wing 111-116 (average 113.1) mm.; tail 90-85 (89.2); exposed culmen 14.5-15.5 (14.8); tarsus 22.2-23 (22.6). The three adult females measure: wing 111-112 (111.5); tail 86.2-89 (87.9); exposed culmen 14.5-15; tarsus 22-23 (22.5). In order to determine the status of the Newfoundland Pine Grosbeak, a study of more breeding birds from Canada is essential.

The Pine Grosbeak was found in nearly all the woods where coniferous trees were scarce or wanting. The bird apparently thrives largely on berries. On several occasions, birds were surprised while eating the brilliant fruit of *Viburnum pauciflorum* Rafinesque. One bird, a beautiful red male, was watched for half an hour. It was observed to bite the fruit very carefully and slide the pulp in sidewise through its bill, in such a way that the skin and hard parts were removed and fell to the ground.

27. CARPODACUS PURPUREUS PURPUREUS (Gmelin).

Purple Finch.

Two adult males and a young female from Nicholville, July 10th to 17th.

No others were observed, but one was heard singing at Nicholville on July 9th.

28. *LOXIA CURVIROSTRA PERCNA* Bent.

Newfoundland Crossbill.

One adult male, and four young of both sexes, Nicholsville and Hopley Hills, July 10th to July 27th.

The Newfoundland Crossbill represents one of the best local races which has been described from Newfoundland. Its large bill is one its most distinguishing features.

Flocks of Crossbills were observed flying over the Humber on many different evenings. It was only on rainy days that these birds could be secured. At these times the birds flew low, and when once alighted seemed loth to leave their perch.

29. *LOXIA LEUCOPTERA* Gmelin.

White-winged Crossbill.

One adult and one immature male, Nicholsville, and Hopley Hills, July 20th and July 26th.

The one immature specimen is much darker than any of the juvenile specimens of the species which I have been able to study. A microscopic examination of the barbules shows that this darkness is not due to staining from balsam or dirt. The markings themselves are darker. The one adult male has a greater development of black in proportion to its warm tones than has the average bird from the mainland. Still a larger series of Newfoundland birds may show that these differences are only tendencies and not worthy of sub-specific distinction.

30. *SPINUS PINUS* (Wilson).

Pine Siskin.

Four adult males and three immature of both sexes from Deer Lake, Nicholsville, and Port au Port, July 1st to August 31st.

This little Finch does much to enliven the vast stretches of burnt-over country which today cover so much of Newfoundland. With Lincoln's Sparrow and an occasional Woodpecker, it affords the only sign of life throughout a large part of the Upper Humber region.

31. *PASSERCULUS SANDWICHENSES SAVANNA* (Wilson).

Savanna Sparrow.

Six adults of both sexes from Nicholsville, Hopley Hills, Port au Port, and Lewis Hills, July 26th to August 19th.

These six specimens average somewhat darker than breeding birds from New England. The spotting of the ventral surface is richer and darker, the dorsal centers of the feathers are blacker. Labrador birds show similar peculiarities, but it is not apparent that these differences are a constant feature. If the Newfoundland birds should be found to have some constant difference from New England birds, they will have to receive the name *P. s. labradorum* Howe.

32. *ZONOTRICHIA LEUCOPHRYS LEUCOPHRYS* (J. R. Forster).

White-crowned Sparrow.

One immature male, Spruce Brook, September 15, 1915.

This specimen was the only White-crowned Sparrow observed throughout the trip. It was apparently a migrant.

33. *ZONOTRICHIA ALBICOLLIS* (Gmelin).

White-throated Sparrow.

Seven adults of both sexes from Deer Lake, June 26th to July 1st. The White-throated Sparrow was seen in nearly all the lowlands visited. It is replaced on the high barren lands by the Savanna Sparrow. Both Sparrows breed commonly.

34. *JUNCO HYEMALIS HYEMALIS* (Linné).

Junco.

Three adults and three immatures of both sexes from Nicholsville, Port au Port, and Spruce Brook, July 5th to September 18th.

The Junco like many other Newfoundland birds shows a tendency towards darkness. This is especially noticeable in young birds which

have assumed their first plumage. The dark spots on the feathers are broader and blacker than in New England birds of the same age. There is apparently no constant difference in the adults from Newfoundland and the mainland.

The Junco does not breed at all commonly in Newfoundland. Few were observed besides those collected, and none at different localities.

35. *MELOSPIZA LINCOLNI LINCOLNI* (Audubon).

Lincoln's Sparrow.

Eight adults of both sexes and one young male from Deer Lake, Nicholsville, and Spruce Brook, June 28th to September 10th.

Lincoln's Sparrow is the commonest bird about all the Newfoundland clearings. I found it fearless, almost confiding, during the last week of June and the first of July. A nest with partly fledged young was found June 27th.

36. *MELOSPIZA GEORGIANA* (Latham).

Swamp Sparrow.

Seven adults of both sexes and one immature male from Spruce Brook and Lewis Hills, August 19th to September 18th.

This species was met with only as a migrant. It may possibly breed at the foot of the Lewis Hills, but my observations do not bear this out. I did not find it at all along the Humber.

37. *PASSERELLA ILIACA* (Merrem).

Fox Sparrow.

Seven adults of both sexes and one immature male from Deer Lake and Nicholsville, June 26th to July 17th.

These seven adults which were taken at the height of the breeding season average grayer than mainland birds. This tendency is not a constant difference.

The Fox Sparrow was found abundantly everywhere except on the high barrens.

38. IRIDOPROCNE BICOLOR (Vieillot).

Tree Swallow.

Five adults of both sexes from Nicholasville, July 5th to July 21st.

Tree Swallows were found breeding in the immediate vicinity of Nicholasville. When the young were out of the nests, both young and old would perch on a telegraph wire overhanging the Upper Humber. It was only at this point that large flocks were observed.

39. MNIIOTILTA VARIA (Linné).

Black and White Warbler.

Two adult males and an adult female from Deer Lake, Nicholasville, and Lewis Hills, June 30th to August 24th.

The Black and White Warblers of Newfoundland are apparently darker than New England breeding birds. The white areas are narrower and the black ones broader. But, again, this darkness is not always a constant feature, since some of the New England specimens are nearly identical, or at least fall within the range of our small series.

Other birds of this species were observed at Nicholasville, July 2nd to 10th. This bird was not abundant in the region traversed.

40. DENDROICA AESTIVA AMNICOLA Batchelder.

Newfoundland Yellow Warbler.

Four adult specimens from Deer Lake, Nicholasville, and Lewis Hills, July 3rd to August 25th.

This well-marked subspecies was found in a somewhat different habitat than *D. a. aestiva* (Gmelin) of Nova Scotia. Instead of frequenting the bushy brooksides, as its subspecific name would imply, the bird seemed to prefer the tall stands of deciduous trees. I became very familiar with this Warbler in the woods on the north side of Deer Lake, but I did not meet with it at all around any of the many bushy swamps which extend over so much of Newfoundland.

41. *DENDROICA CORONATA* (Linné).

Myrtle Warbler.

Five adults of both sexes from Nicholsville and Spruce Brook, July 8th to September 16th.

Since no other specimens were observed, the Myrtle Warbler cannot be a very common bird in Newfoundland.

42. *DENDROICA MAGNOLIA* (Wilson).

Magnolia Warbler.

Two pair of adults and a young male from Deer Lake, Nicholsville, and Port au Port, June 26th to August 12th.

Magnolia Warblers were seen on several other occasions throughout the month of July. It is a fairly common species.

43. *DENDROICA STRIATA* (J. R. Forster).

Black-poll Warbler.

Five adults of both sexes from Nicholsville, Port au Port, and Lewis Hills, the dates ranging through July and August.

This Warbler was found to be a common breeding bird. Singing males were observed frequently between the dates of June 26th to July 10th.

44. *DENDROICA VIRENS* (Gmelin).

Black-throated Green Warbler.

Three adult males from Spruce Brook and Nicholsville.

No other birds of this species were observed.

45. *SEIURUS AUROCAPILLUS FURVIOR* Batchelder.

Newfoundland Oven-bird.

Four adults of both sexes from Nicholsville, Romain's Brook, and Spruce Brook, July 20th to September 1st.

This dark race of Oven-bird frequents the very densest woods. It

was indeed surprising to find the Oven-bird in such damp situations. On many occasions throughout the month of July, I heard the ringing call of the Oven-bird arising from impenetrable masses of stunted spruce and juniper. It would be interesting to know if this dark, damp environment has not had some direct influence on the change of coloration of this subspecies.

SEIURUS NOVEBORACENSIS NOVEBORACENSIS (Gmelin).

Water Thrush.

Eight adults of both sexes from Deer Lake and Nicholville, June 26th to August 3rd.

Water Thrushes were found abundantly in all the wooded regions, especially in the vicinity of streams.

47. OPORORNIS PHILADELPHIA (Wilson).

Mourning Warbler.

Six adults of both sexes from Nicholville, Port au Port, and Spruce Brook.

Although this bird was not abundant, it was seen on several other occasions throughout the month of July.

48. GEOTHLYPIS TRICHAS BRACHIDACTYLA (Swainson).

Northern Yellow-throat.

Two adult females from Lewis Hills and Spruce Brook, August 25th to September 10th.

Both of these specimens are distinctly darker than any fall birds of this species from the mainland. But knowing how many other Newfoundland birds show only tendencies toward a darkening, I do not feel inclined, without further material, to describe the Newfoundland bird as a race.

49. *WILSONIA PUSILLA PUSILLA* (Wilson).

Wilson's Warbler.

Six adults of both sexes from Deer Lake, Nicholsville, and Spruce Brook.

Others were observed everywhere in the lowlands from June 25th to September 14th. The Black-poll and Wilson's Warbler are the commonest warblers in Newfoundland.

50. *SETOPHAGA RUTICILLA* (Linné).

Redstart.

Three adult males, Deer Lake and Nicholsville, July 1st to 20th.

These three males show a greater extension of their black areas than most of the mainland birds examined. Some specimens, however, are so nearly alike that no distinction can be made between them.

The Redstart was found only in the Humber River region. Here there are many deciduous woods, which together make up the favorite haunts of the bird.

51. *ANTHUS RUBESCENS* (Tunstall).

Pipit.

Two youngish birds, one from the Hobley Hills, July 24th, and the other from the Lewis Hills, August 21st.

The high barren grounds of the Hobley and Lewis Hills form an ideal home for the Pipit. Several flocks were seen in these regions.

52. *NANNUS HIEMALIS HIEMALIS* (Vieillot).

Winter Wren.

One adult female and five youngish specimens of both sexes from Nicholsville, Port au Port, Lewis Hills, and Spruce Brook, the dates ranging through the whole summer.

The one adult female is distinctly darker than any specimens from Maine and New Brunswick which I have examined. Without a large series, it would be difficult to determine whether or not this tendency is worthy of subspecific distinction.

The Newfoundland Oven-bird and Winter Wren are the only inhabitants of the dense and soaking undergrowths which choke most Newfoundland valleys. The sharp crescendo of the first and the bubbling warble of the second ring out in pleasing contrast. These notes were heard on many occasions, but the songsters seldom came into view.

53. *SITTA CANADENSIS* Linné.

Red-breasted Nuthatch.

One adult female from the Lewis Hills, August 17th. No others were seen or heard.

54. *PENTHESTES ATRICAPILLUS ATRICAPILLUS* (Linné).

Black-capped Chickadee.

Eleven adults of both sexes, and three young birds, Nicholville, Port au Port, Lewis Hills, and Spruce Brook, July 6th to September 18th.

The adults in this series vary considerably among themselves, but they average browner, less gray above, than mainland birds. The buff of the sides is conspicuously richer. In size they are nearly identical with mainland specimens. We would expect in a region fostering specialization, such as Newfoundland, that the Black-capped Chickadee would be represented by a geographical race, but I have been unable to find one distinguishing character to separate the Newfoundland bird.

Little families of Black-capped Chickadees were met with on many of my tramps through the more open woods. The younger birds of the family would be just as excited as their parents at my "squeaking." These family groups became more disintegrated during the latter part of August. At least at that time, I searched in vain for fully adult birds in such groups.

55. *PENTHESTES HUDSONICUS LITTORALIS* (H. Bryant).

Acadian Chickadee.

Six adults and six youngish birds of both sexes from Deer Lake, Nicholville, Hopley Hills, Port au Port, and Spruce Brook, July 3rd to September 16th.

One of the surprises in studying the collection was to find that the brown Chickadee of Newfoundland was typical *P. h. littoralis* and not *P. h. nigricans* C. W. Townsend of the nearby Labrador coast. Our specimens are indistinguishable from specimens from Nova Scotia and Maine, and very different from the type of the latter race.

It has been mentioned above that the Newfoundland Jay and the Acadian Chickadee make up a large part of the avifauna of the Newfoundland "Mash." The Chickadee was found abundantly in the coniferous trees surrounding these bogs.

56. *REGULUS CALENDULA CALENDULA* (Linné).

Ruby-crowned Kinglet.

Four adult males and one adult female from Nicholville and Spruce Brook, July 7th to September 10th.

The Ruby-crowned Kinglet was observed very often in the deciduous woods east of Nicholville. It was apparently breeding there. Only occasional birds were seen elsewhere.

57. *HYLOCICHLA FUSCESCENS SALICICOLA* Ridgway.

Willow Thrush.

Eight adults of both sexes and one immature male from Romain's Brook, Port au Port, Lewis Hills, and Spruce Brook.

Newfoundland "Veerys" are identical with specimens from Montana, Minnesota, and British Columbia.

H. f. fuliginosa Howe, (1900, p. 271), must be considered synonymous with the Willow Thrush. In size as well as in coloration, both adults and immatures agree perfectly with the western bird.

The Newfoundland "Veery" was observed only in the rich limestone

areas of the southwest. I never met with it at all in the woods covering the sandstones and shales of the Upper Humber. As pointed out (p. 544), the limestone areas support many plants known elsewhere from western America only. This would seem to indicate a correlation between bird and plant life.

58. *HYLOCICHLA ALICIAE ALICIAE* (Baird).

Gray-cheeked Thrush.

One adult female from Nicholville, July 8th.

I made a special effort to find other specimens of this species, but never succeeded. The bird must be very rare in Newfoundland, at least in the regions visited.

59. *HYLOCICHLA USTULATA SWAINSONI* (Tschudi).

Olive-backed Thrush.

Thirty specimens of both sexes from Deer Lake, Nicholville, and Hopley Hills, June 27th and throughout the month of July.

The Olive-backed Thrush is by far the commonest thrush in Newfoundland. It apparently prefers the drier woods, especially those in which clearings have been made.

60. *HYLOCICHLA GUTTATA PALLASI* (Cabanis).

Hermit Thrush.

Fifteen specimens of both sexes from Nicholville and Spruce Brook.

Newfoundland birds of this species average slightly darker and grayer than breeding birds from New England. The markings of the breast are slightly blacker. But since certain specimens from New England approach in coloration very closely to Newfoundland birds, it seems advisable to consider these differences as tendencies rather than characters distinctive of a geographic race.

The Hermit Thrush is often found in company with the Olive-backed, but it seems to prefer the water more than the latter species. Just at dusk, many Hermit Thrushes were always to be found along

the edge of the Humber. They would dart out after some passing insects and then drop back to the shore. Most of the specimens in the above series were collected from a canoe which I paddled close to the shore during twilight hours.

61. *PLANESTICUS MIGRATORIUS MIGRATORIUS* (Linné).

American Robin.

Two adult males and three adult females, Deer Lake, Nicholsville, and Port au Port.

As with the Northern Yellow-throat, this limited series shows a decided tendency towards a darkening of the coloration. But here again, it seems advisable not to describe a race because our knowledge of the complete range of variation in Newfoundland and mainland birds is limited to so small a series.

Robins were observed abundantly only in the vicinity of dwellings. On the lawns near Deer Lake Station, they were seen almost every day.

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The following Publications of the Museum of Comparative Zoölogy are in preparation;—

LOUIS CABOT. Immature State of the Odonata, Part IV.

E. L. MARK. Studies on Lepidosteus, continued.

E. L. MARK. On Arachnactis.

Reports on the Results of Dredging Operations in 1877, 1878, 1879, and 1880, in charge of ALEXANDER AGASSIZ, by the U. S. Coast Survey Steamer "Blake," as follows:—

A. MILNE EDWARDS and E. L. BOUVIER. The Crustacea of the "Blake."

A. E. VERRILL. The Alcyonaria of the "Blake."

Reports on the Results of the Expedition of 1891 of the U. S. Fish Commission Steamer "Albatross," Lieutenant Commander Z. L. TANNER, U. S. N., Commanding, in charge of ALEXANDER AGASSIZ, as follows:—

K. BRANDT. The Sagittae.

K. BRANDT. The Thalassicolae.

O. CARLGREN. The Actinarians.

R. V. CHAMBERLIN. The Annelids.

W. R. COE. The Nemertean.

REINHARD DOHRN. The Eyes of Deep-Sea Crustacea.

H. J. HANSEN. The Cirripeds.

H. J. HANSEN. The Schizopods.

W. A. HERDMAN. The Ascidians.

S. J. HICKSON. The Antipathids.

E. L. MARK. Branchiocerianthus.

JOHN MURRAY. The Bottom Specimens.

P. SCHIEMENZ. The Pteropods and Heteropods.

THEO. STUDER. The Alcyonarians.

H. B. WARD. The Sipunculids.

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of ALEXANDER AGASSIZ, on the U. S. Fish Commission Steamer, "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., Commanding, as follows:—

R. V. CHAMBERLIN. The Annelids.

H. L. CLARK. The Holothurians.

— The Volcanic Rocks.

— The Coralliferous Limestones.

S. HENSHAW. The Insects.

G. W. MÜLLER. The Ostracods.

MARY J. RATHBUN. The Crustacea Decapoda.

G. O. SARS. The Copepods.

L. STEJNEGER. The Reptiles.

T. W. VAUGHAN. The Corals, Recent and Fossil.

A. WETMORE. The Mammals and Birds.

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- Reports on the Results of the Expedition of 1891 of the U. S. Fish Commission Steamer "Albatross," Lieut. Commander Z. L. Tanner, U. S. N., commanding, in charge of Alexander Agassiz.
- Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of Alexander Agassiz, on the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., commanding.
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